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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,180	10/15/2003	Lionell K. Griffith	7171-10910207852	7586
167	7590	02/21/2006	EXAMINER	
FULBRIGHT AND JAWORSKI LLP 555 S. FLOWER STREET, 41ST FLOOR LOS ANGELES, CA 90071			KAO, CHIH CHENG G	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 02/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/687,180	<b>Applicant(s)</b> GRIFFITH, LIONELL K.	
	<b>Examiner</b> Chih-Cheng Glen Kao	<b>Art Unit</b> 2882	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 November 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-14, 21-28 and 35-42 is/are allowed.
- 6) ☒ Claim(s) 1-6, 15-20 and 29-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Objections*

1. Claims 5, 11, 13, 14, 19-21, 25, 27, 38, 33-35, 39, 41, and 42 are objected to because of the following informalities, which appear to be minor draft errors including grammatical and/or lack of antecedent basis problems.

In the following format (location of objection; suggestion for correction), the following correction(s) may obviate the objection(s): (claim 5, line 1, “the optical axis”; replacing “the” with - -an- -), (claim 5, line 2, “the object space”; replacing “the” with - -an- -), (claim 11, line 1, “the orientation”; replacing “the” with - -an- -), (claim 11, line 2, “the sensor surface”; replacing “the” with - -an- -), (claim 13, line 2, “the surface”; replacing “the” with - -a- -), (claim 13, lines 5-6, “the orientation”; replacing “the” with - -an- -), (claim 14, lines 7-8, “the orientation”; replacing “the” with - -an- -), (claim 19, line 1, “the optical axis”; replacing “the” with - -an- -), (claim 20, line 3, “the object space”; replacing “the” with - -an- -), (claim 21, line 10, “the object space”; replacing “the” with - -an- -), (claim 25, line 1, “the orientation”; replacing “the” with - -an- -), (claim 25, line 2, “the sensor surface”; replacing “the” with - -a- -), (claim 27, line 2, “the surface”; replacing “the” with - -a- -), (claim 27, line 6, “the orientation”; replacing “the” with - -an- -), (claim 28, line 8, “the orientation”; replacing “the” with - -an- -), (claim 33, lines 1-2, “the optical axis”; replacing “the” with - -an- -), (claim 34, line 3, “the object space”; replacing “the” with - -an- -), (claim 35, line 10, “the object space”; replacing “the” with - -an- -), (claim 39, lines 1-2, “the orientation”; replacing “the” with - -an- -), (claim 39, line 2, “the sensor surface”; replacing “the” with - -a- -), (claim 41, line 3, “the surface”; replacing “the” with - -a- -), (claim

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41, line 7, "the orientation"; replacing "the" with - -an- -), and (claim 42, line 9, "the orientation"; replacing "the" with - -an- -).

For purposes of examination, the claims have been treated as such. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5, 15-17, 19, 29-31, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano (JP 02-205760) in view of McCroskey et al. (US Patent 5138642).

3. Regarding claims 1, 15, and 29, Hirano discloses a digitized tomosynthesis method, system, and apparatus (title and abstract) for obtaining an image of an object (fig. 1, #2) in which a ray of energy from a source (fig. 1, #1) travels through the object to impinge on an energy sensor (fig. 1, #4, 6, and 7) defining an image plane and in which the object is rotated about an axis (fig. 1, #8) whereby an image is acquired by the energy sensor at successive rotational positions of the object (abstract), wherein the object (fig. 1, #2), but not the energy source (fig. 1, #1), is rotated about an axis of rotation (fig. 1, via #8), the axis of rotation being at a canted angle with respect to the image plane (fig. 1, #4 and 6).

However, Hirano fails to disclose obtaining a 3D volumetric image.

McCroskey et al. teaches obtaining a 3D volumetric image (col. 12, lines 10-30).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the method, system, and apparatus of Hirano with the 3D volumetric imaging of McCroskey et al., since one would be motivated to make such a modification for obtaining more information.

4. Regarding claims 2, 3, 16, 17, 30, and 31, Hirano further discloses x-ray radiation (title).
5. Regarding claims 5, 19, and 33, Hirano further discloses an optical axis of the source (fig. 1, #1) perpendicular to the image plane (fig. 1, #7).
6. Claims 4, 18, and 32 rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano and McCroskey et al. as applied to claims 1, 15, and 29 above, and further in view of Hsieh (US Patent 6226350).

Hirano as modified above suggests a method, system, and apparatus as recited above.

However, Hirano fails to disclose a flat panel digital detector.

Hsieh teaches a flat panel digital detector (col. 2, lines 27-31).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the method, system, and apparatus of Hirano as modified above with the detector of Hsieh, since one would be motivated to make such a modification to obtain projection data faster (col. 2, lines 27-31) as implied from Hsieh.

7. Claims 6, 20, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano and McCroskey et al. as applied to claim 1, 15, and 29 above, and further in view of Besson et al. (US Patent 6301325) and Feldkamp et al. ("Practical cone-beam algorithm").

Hirano as modified above suggests a method, system, and apparatus as recited above.

However, Hirano fails to specifically disclose mathematically tracing a ray of energy through a voxel, computing a coordinate of a shadow of the voxel on the image plane, and extracting and combining image data to form the object space voxel.

Besson et al. teaches computing a coordinate of a shadow of the voxel on the image plane (col. 5, lines 62-64) and extracting and combining image data to form the object space voxel (col. 1, lines 31-34). Feldkamp et al. teaches mathematically tracing a ray of energy through a voxel (fig. 4, line from source through "Y").

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the method, system, and apparatus of Hirano as modified above with the calculated voxel image of Besson et al., since one would be motivated to make such a modification to better determine the make up of the patient through which rays traverse (col. 1, lines 23-26) as implied from Besson et al.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the method, system, and apparatus of Hirano as modified above with the mathematical tracing of Feldkamp et al., since one would be motivated to make such a modification to perform reconstructions faster (page 612, col. 2, lines 16-18) as shown by Feldkamp et al.

*Allowable Subject Matter*

8. Claims 7-14, 21-28, and 35-42 contain allowable subject matter. The following is a statement of reasons for the indication of allowable subject matter.

9. Regarding claim 7, prior art fails to disclose or fairly suggest in a digitized tomosynthesis method, the improvement according to which an object is rotated about an axis of rotation at a canted angle with respect to an image plane, determining an axis of rotation of an object, and comparing a location of a first shadow image and a location of a second shadow image to determine source and object angles relative to an energy sensor, in combination with all the limitations in the claim. Claims 8-14 are allowed by virtue of their dependency.

10. Regarding claims 21 and 35, prior art fails to disclose or fairly suggest in a digitized tomosynthesis system or apparatus, the improvement according to which the system or apparatus includes a support for an object enabling the object to be rotated about an axis of rotation at a canted angle with respect to an image plane, and a computer chip containing one or more computer programs being capable of comparing a location of a first shadow image and a location of a second shadow image to determine source and object angles relative to an energy sensor, in combination with all the limitations in each respective claim. Claims 22-28 and 36-42 are allowed by virtue of their dependency.

***Response to Arguments***

11. Applicant's arguments with respect to claims 1-6, 15-20, and 29-34 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



gk



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